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NORTHERN ROCKY MOUNTAIN
FOREST AND RANGE EXPERIMENT STATION

No. 78 Missoula, Montana April, 1937

LARCH-DOUGLAS FIR BOARD-FOOT YIELD TABLES

By L. J. Cummings, Assistant Forester.

A study of growth rates and yields of forest areas in the larch-Douglas fir type was recently made by the Northern Rocky Mountain Forest and Range Experiment Station. Since this is the first study of this nature to be made for the type, the resultant yield tables will be of interest and practical value to forest owners and those concerned with problems of land use planning.

The attached yield table shows gross board foot volume per acre at ten-year age intervals for each of five site classes, showing yields per acre for areas supporting stands of varying degrees of stocking.

Discussion of the tables is limited here to a brief outline of the method of their application.

For any given stand, the growth of which is to be predicted, the following information must be determined:

1. Age
2. Site quality
3. Stocking percent

Age determination

Total age of a tree is indicated by the number of growth rings developed at the root crown (i.e. at ground level). This is determined by counting the rings on a stump or other convenient section of the tree and adding to this the age required to reach the height at which the count is made. The number of years to be added for any height can be easily found by cutting a few seedlings or saplings on the area and observing the difference in age at ground level and point of count. An addition

of 3-5 years will be found approximately correct for stump heights of one and one-half to two and one-half feet.

The average age of the dominant and codominant trees which represent the greater portion of the volume should be taken as the age of the stand. Occasional old veterans or relics in the stand should not be considered in the determination of this average age.

Site quality determination

Site quality is the relative wood-producing capacity of a given area.

To apply yield table values to any area it is necessary to classify it as to site quality so that the correct table may be used. This is done by determining the average height of dominant and codominant trees now growing upon the area and referring to the attached site classification curves which are based on the average height growth of dominant and codominant trees at various ages. For example, the dominant and codominant trees in a given 100-year old stand average 97 feet tall. On the site classification chart plot the height on the given age. The curve nearest which the plotted point falls indicates the proper site quality of the area, which in this case is site quality III.

The average total height of 10 or 15 representative dominant and codominant trees is usually sufficient for site quality determination.

Stocking percent determination

Stocking is the extent that areas are utilized by tree growth, taking into consideration number, size and distribution of trees on the area. Stocking percent is the measure of the relative degree an area is stocked as related to fully stocked or 100 percent stocked areas. The values shown in the tables for the 100 percent stocked areas can be attained only on selected areas of an acre or less. For this reason fairly well stocked stands occurring over larger areas will usually average less than 75 percent stocked.

The most satisfactory means of estimating stocking is by average volume per acre. This may be determined by ordinary cruising methods, making no allowance for defect or breakage.

The tables presented here show yields per acre covering the range of stocking percentages for the given site class and age. The stocking percent of an area may be read directly from the tables by finding in the appropriate table for the site class represented the value that equals the volume per acre

obtained by the cruise. For example: A stand of larch-Douglas fir, site III, 150 years old, has an average volume per acre of 20,280 board feet gross scale. In the site III table, opposite age 150 the tabular volume 20,280 is read in the 60 percent column indicating that the area is 60 percent stocked.

Intermediate stocking values may be obtained by computing the ratio between the average volume per acre and the tabular 100 percent value. For example: Given a 150-year old stand, site III, with an average volume per acre of 16,900 board feet. The 100 percent value at that site and age is 33,800. Stocking percent is $\frac{16900}{33800}$ or 50 percent.

Use of tables for predicting future yields

The yield of a stand ten years in the future may be predicted from the yield tables simply by adding ten years to the present age of the stand and reading from the table the yield at that age, degree of stocking, and site predetermined by the above described methods. For example: Given a stand of larch-Douglas fir, site III, 150 years old, and 60 percent stocked. The owner desires to know the yield of the stand ten years hence. Age of stand ten years hence is 160 years. Site and stocking remain the same. Estimated yield as shown by the table is 22,860 board feet.

Intermediate values of the yield table are easily obtained in interpolation. For example: The yield of a 95-year old stand of larch-Douglas fir, site III, 60 percent stocked, may be computed as follows:

1. Yield at 90 years equals 4,860 board feet
2. " " 100 " " 6,720 " "
3. Difference between yield at 90 and 100 years equals 1,860 board feet
4. Growth for 1 year is 1,860 ÷ 10 or 186 board feet
5. Growth for 5 years is 186 x 5, or 930 board feet
6. Yield at 95 years equals the yield at 90 years plus growth for 5 years, i.e., 4,860 + 930, or 5,790 board feet.

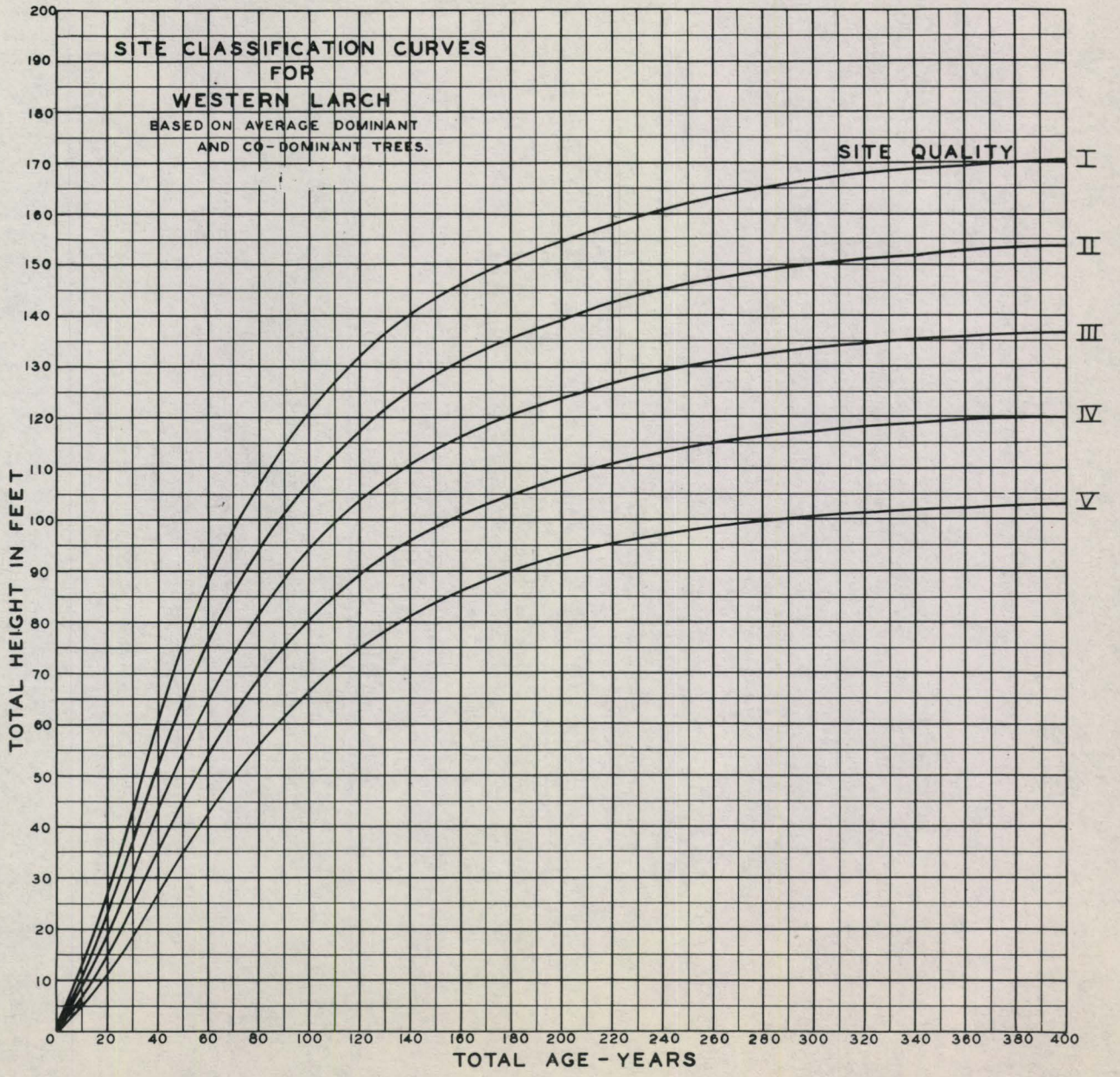
Allowances for breakage or defect which have not been made in these tables must be estimated separately for each stand and the yield values reduced accordingly.

RE-NRM
Forest Survey
Growth Phase

BOARD-FOOT VOLUME PER ACRE IN TREES 13.0 INCHES D.B.H. AND LARGER

Scribner Rule to Merchantable Top

Total age	Site I Percent Stocked					Site II Percent Stocked					Site III Percent Stocked					Site IV Percent Stocked					Site V Percent Stocked				
Years	100%	80%	60%	40%	20%	100%	80%	60%	40%	20%	100%	80%	60%	40%	20%	100%	80%	60%	40%	20%	100%	80%	60%	40%	20%
40	500	400	300	200	100																				
50	3400	2720	2040	1360	680	1200	960	720	480	240	100	80	60	40	20										
60	8000	6400	4800	3200	1600	3800	3040	2280	1520	760	1400	1120	840	560	280	40	32	24	16	8					
70	14500	11600	8700	5800	2900	7500	6000	4500	3000	1500	3200	2560	1920	1280	640	800	640	480	320	160					
80	22900	18320	13740	9160	4580	12200	9760	7320	4880	2440	5400	4320	3240	2160	1080	1700	1360	1020	680	340					
90	33900	27120	20340	13560	6780	18000	14400	10800	7200	3600	8100	6480	4860	3240	1620	2800	2240	1680	1120	560	70	56	42	28	14
100	43500	34800	26100	17400	8700	25400	20320	15240	10160	5080	11200	8960	6720	4480	2240	4000	3200	2400	1600	800	300	240	180	120	60
110	51400	41120	30840	20560	10280	33100	26480	19860	13240	6620	14900	11920	8940	5960	2980	5300	4240	3180	2120	1000	600	480	360	240	120
120	58200	46560	34920	23280	11640	39800	31840	23880	15920	7960	19200	15360	11520	7680	3840	6800	5440	4080	2720	1360	1000	800	600	400	200
130	64300	51440	38580	25720	12860	45800	36640	27480	18320	9160	24100	19280	14460	9640	4820	8400	6720	5040	3360	1680	1500	1200	900	600	300
140	69800	55840	41880	27920	13960	51200	40960	30720	20480	10240	29100	23280	17460	11640	5820	10200	8160	6120	4080	2040	2000	1600	1200	800	400
150	74800	59840	44880	29920	14960	56000	44800	33600	22400	11200	33800	27040	20280	13520	6760	12100	9680	7260	4840	2420	2600	2080	1560	1040	520
160	79500	63600	47700	31800	15900	60400	48320	36240	24160	12080	38100	30480	22860	15240	7620	14100	11280	8460	5640	2820	3200	2560	1920	1280	640
170	83800	67040	50280	33520	16760	64400	51520	38640	25760	12880	42000	33600	25200	16800	8400	16200	12960	9720	6480	3240	3900	3120	2340	1560	780
180	87700	70160	52620	35080	17540	68100	54480	40860	27240	13620	45500	36400	27300	18200	9100	18400	14720	11040	7360	3680	4600	3680	2760	1840	920
190	91300	73040	54780	36520	18260	71500	57200	42900	28600	14300	48700	38960	29220	19480	9740	20700	16560	12420	8280	4140	5300	4240	3180	2120	1060
200	94600	75680	56760	37840	18920	74500	59600	44700	29800	14900	51600	41280	30960	20640	10320	23100	18480	13860	9240	4620	6000	4800	3600	2400	1200
210	97600	78080	58560	39040	19520	77300	61840	46380	30920	15460	54200	43360	32520	21680	10840	25500	20400	15300	10200	5100	6600	5280	3960	2640	1320
220	100300	80240	60180	40120	20060	79800	63840	47880	31920	15960	56600	45280	33960	22640	11320	27800	22240	16680	11120	5560	7200	5760	4320	2880	1440
230	102800	82240	61680	41120	20560	82100	65680	49260	32840	16420	58800	47040	35280	23520	11760	29900	23920	17940	11960	5980	7800	6240	4680	3120	1560
240	105100	84080	63060	42040	21020	84200	67360	50520	33680	16840	60800	48640	36480	24320	12160	31900	25520	19140	12760	6380	8300	6640	4980	3320	1660
250	107200	85760	64320	42880	21440	86200	68960	51720	34480	17240	62600	50080	37560	25040	12520	33700	26960	20220	13480	6740	8800	7040	5280	3520	1760
260	109200	87360	65520	43680	21840	88000	70400	52800	35200	17600	64300	51440	38580	25720	12860	35400	28320	21240	14160	7080	9300	7440	5580	3720	1860
270	111100	88880	66660	44440	22220	89700	71760	53820	35880	17940	65800	52640	39480	26320	13160	36900	29520	22140	14760	7380	9800	7840	5880	3920	1960
280	112800	90240	67680	45120	22560	91200	72960	54720	36480	18240	67200	53760	40320	26880	13440	38300	30640	22980	15320	7660	10200	8160	6120	4080	2040
290	114400	91520	68640	45760	22880	92600	74080	55560	37040	18520	68500	54800	41100	27400	13700	39600	31680	23760	15840	7920	10600	8480	6360	4240	2120
300	115900	92720	69540	46360	23180	93900	75120	56340	37560	18780	69700	55760	41820	27880	13940	40800	32640	24480	16320	8160	11000	8800	6600	4400	2200
310	117300	93840	70380	46920	23460	95100	76080	57060	38040	19020	70800	56640	42480	28320	14160	41900	33520	25140	16760	8380	11400	9120	6840	4560	2280
320	118600	94880	71160	47440	23720	96200	76960	57720	38480	19240	71800	57440	43080	28720	14360	42900	34320	25740	17160	8580	11800	9440	7080	4720	2360
330	119800	95840	71880	47920	23960	97300	77840	58380	38920	19460	72800	58240	43680	29120	14560	43800	35040	26280	17520	8760	12200	9760	7320	4880	2440
340	120900	96720	72540	48360	24180	98300	78640	58980	39320	19660	73700	58960	44220	29480	14740	44700	35760	26820	17880	8940	12600	10080	7560	5040	2520
350	121900	97520	73140	48760	24380	99200	79360	59520	39680	19840	74500	59600	44700	29800	14900	45500	36400	27300	18200	9100	12900	10320	7740	5160	2580
360	122800	98240	73680	49120	24560	100100	80080	60060	40040	20020	75300	60240	45180	30120	15060	46300	37040	27780	18520	9260	13200	10560	7920	5280	2640
370	123700	98960	74220	49480	24720	100900	80720	60540	40360	20180	76000	60800	45600	30400	15200	47000	37600	28200	18800	9400	13500	10800	8100	5400	2700
380	124500	99600	74700	49800	24900	101700	81360	61020	40680	20340	76700	61360	46020	30680	15340	47700	38160	28620	19080	9540	13800	11040	8280	5520	2760
390	125200	100160	75120	50080	25040	102400	81920	61440	40960	20480	77300	61840	46380	30920	15460	48200	38560	28920	19280	9640	14100	11280	8460	5640	2820
400	125900	100720	75540	50360	25180	103100	82480	61860	41240	20620	77900	62320	46740	31160	15580	48700	38960	29220	19480	9740	14400	11520	8640	5760	2880


SITE CLASSIFICATION CURVES
FOR
WESTERN LARCH
BASED ON AVERAGE DOMINANT
AND CO-DOMINANT TREES.
SITE QUALITY
I
II
III
IV
V
TOTAL HEIGHT IN FEET
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
TOTAL AGE - YEARS